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Name..........................

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FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2015

(U.G.—CCSS)

Open Course

PH 5D 01 (1)—NON–CONVENTIONAL ENERGY SOURCES

(2013 Admissions)

Three Hours

Maximum : 30 Weightage

Objective questions (Answer *all* questions) :

1. In Sun, the energy production occurs by :
   - (a) Nuclear fission.
   - (b) Nuclear fusion.
   - (c) Photovoltaic effect.
   - (d) Green house effect.

2. Which among the following is a renewable source of energy ?
   - (a) Natural gas.
   - (b) Biomass.
   - (c) Coal.
   - (d) Petrol.

3. The ratio of the path of the sun's rays through the atmosphere to the length of the path when the sun is at the zenith is called :
   - (a) Air mass.
   - (b) Declination.
   - (c) Solar constant.
   - (d) Azimuth.

4. Which among the following is not a part of a solar cooker ?
   - (a) Glass cover.
   - (b) Reflector.
   - (c) Blackened tray.
   - (d) Solar cell.

5. In a flat plate collector, the absorber plate should :
   - (a) Reflect maximum solar radiation.
   - (b) Conduct maximum heat to surroundings.
   - (c) Absorb maximum solar radiation.
   - (d) Radiate maximum heat to surroundings.

6. The major disadvantage of a wind energy conversion system is that :
   - (a) It is renewable.
   - (b) It is less noisy.
   - (c) It is highly polluting.
   - (d) The source is fluctuating.

7. The fraction of the free-flow wind power that can be extracted by the rotor of a windmill is called :
   - (a) Power co-efficient.
   - (b) Rotor factor.
   - (c) Wind factor.
   - (d) Electrical factor.

8. In which units is the power of a battery measured ?

    (a) Tesla.   (b) Watts.

    (c) Amperes.   (d) Gauss.

9. From the following options, identify the conventional source of energy :

    (a) Solar energy.   (b) Hydro energy.

    (c) Hydrogen energy.   (d) Tidal energy.

10. Which among the following is the energy source not derived from ocean ?

    (a) OTEC.   (b) Hydroelectric energy.

    (c) Photovoltaic energy.   (d) Tidal energy.

11. For geothermal energy utilization, which among the following is not applicable ?

    (a) It is cheap.   (b) Source is intermittent.

    (c) Less polluting.   (d) Efficiency is low.

12. In a fuel cell, the commonly used fuel is :

    (a) Hydrogen.   (b) Nickel.

    (c) Water.   (d) Cadmium.

$$(12 \times \frac{1}{4} = 3 \text{ weightage})$$

II. Short answer questions (Answer *all* questions) :

13. Define the term solar constant. What is its value ?

14. What do you mean by a solar green house ?

15. List any *four* advantages of a solar furnace.

16. Give four advantages of wind energy utilization.

17. What do you mean by geothermal energy ?

18. What are the essential components of a tidal power plant ?

19. Mention four disadvantages of tidal power.

20. What are the main uses of a storage battery ?

21. Write down the problems associated with storage of hydrogen fuel in motor vehicles.

$$(9 \times 1 = 9 \text{ weightage})$$

III. Short essay type questions (Answer any *five* questions) :

22. With the help of a schematic, discuss the working principle of a solar pond.

23. Briefly explain the energy conversion mechanism of a solar cell.

24. Explain the energy storage options in wind energy conversion.

25. What is meant by a wind turbine generator ? Discuss the horizontal axis and vertical axis types of wind turbine generators.

26. Discuss the applications of geothermal energy.

27. Discuss the origin of the source of energy in waves. Outline a method for converting wave energy to mechanical energy.

28. List the advantages and disadvantages of a fuel cell.

$(5 \times 2 = 10$ weightage$)$

IV. Essay questions (Answer any *two* questions) :

29. Explain the principle of conversion of solar radiation to heat energy. Discuss the working principle of a natural circulation solar water heater.

30. What do you mean by the term biomass ? Discuss the different solid, liquid and gaseous biofuels. Explain the biomass conversion methods.

31. Discuss the principle of ocean thermal energy conversion (OTEC). Discuss the different methods for utilizing ocean thermal differences, with the help of suitable schematics.

$(2 \times 4 = 8$ weightage$)$